

PATENT COOPERATION TREAT

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 06 June 2001 (06.06.01)	Applicant's or agent's file reference RCA89608
International application No. PCT/US00/18893	Priority date (day/month/year) 15 July 1999 (15.07.99)
International filing date (day/month/year) 12 July 2000 (12.07.00)	
Applicant WORRELL, Charles, William et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
09 February 2001 (09.02.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Antonia Muller Telephone No.: (41-22) 338.83.38
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INTERNATIONAL SEARCH REPORT

Intern: al Application No

PCT/US 00/18893

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06K7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 409 241 A (TOKYO SHIBAURA ELECTRIC CO) 23 January 1991 (1991-01-23) claims 1,2,4,5 ---	1,2,6-8, 10,11 4,5,12
X A	US 5 847 372 A (KREFT HANS-DIEDRICH) 8 December 1998 (1998-12-08) column 1, line 58 - line 61 claims 2,8,10,17 ---	1,2,6 4
X	US 5 712 472 A (LEE SUNG-CHEOUL) 27 January 1998 (1998-01-27) claims 1,2,5 -----	1,6-8,12

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

13 October 2000

Date of mailing of the international search report

23/10/2000

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Herskovic, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/18893

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0409241 A	23-01-1991	JP 2862177 B	24-02-1999
		JP 3049996 A	04-03-1991
		DE 69003319 D	21-10-1993
		DE 69003319 T	24-02-1994
		KR 9304316 B	26-05-1993
		US 5126548 A	30-06-1992
US 5847372 A	08-12-1998	DE 4406704 C	20-07-1995
		AU 681944 B	11-09-1997
		AU 1753895 A	18-09-1995
		BR 9506922 A	30-09-1997
		CA 2184606 A	08-09-1995
		CN 1142271 A	05-02-1997
		WO 9524019 A	08-09-1995
		DE 19580083 D	17-04-1997
		EP 0748485 A	18-12-1996
		JP 9509770 T	30-09-1997
		PL 316525 A	20-01-1997
US 5712472 A	27-01-1998	CN 1133459 A	16-10-1996
		JP 8263607 A	11-10-1996

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RCA89608	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/US 00/ 18893	International filing date (day/month/year) 12/07/2000	(Earliest) Priority Date (day/month/year) 15/07/1999
Applicant THOMSON LICENSING S.A.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1
☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 00/18893

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06K7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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X	US 5 712 472 A (LEE SUNG-CHEOUL) 27 January 1998 (1998-01-27) claims 1,2,5 -----	1,6-8,12



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

13 October 2000

Date of mailing of the international search report

23/10/2000

Name and mailing address of the ISA

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Authorized officer

Herskovic, M

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/18893

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0409241	A	23-01-1991	JP 2862177 B	24-02-1999
			JP 3049996 A	04-03-1991
			DE 69003319 D	21-10-1993
			DE 69003319 T	24-02-1994
			KR 9304316 B	26-05-1993
			US 5126548 A	30-06-1992
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US 5847372	A	08-12-1998	DE 4406704 C	20-07-1995
			AU 681944 B	11-09-1997
			AU 1753895 A	18-09-1995
			BR 9506922 A	30-09-1997
			CA 2184606 A	08-09-1995
			CN 1142271 A	05-02-1997
			WO 9524019 A	08-09-1995
			DE 19580083 D	17-04-1997
			EP 0748485 A	18-12-1996
			JP 9509770 T	30-09-1997
			PL 316525 A	20-01-1997
<hr/>				
US 5712472	A	27-01-1998	CN 1133459 A	16-10-1996
			JP 8263607 A	11-10-1996
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EXPRESS EL9023 1775 U.S.

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

SHONEMAN, David T.
THOMSON MULTIMEDIA LICENSING INC.
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Princeton, New Jersey 08540
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DTS

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)Date of mailing
(day/month/year) 19.07.2001Applicant's or agent's file reference
RCA89608

IMPORTANT NOTIFICATION

International application No.
PCT/US00/18893International filing date (day/month/year)
12/07/2000Priority date (day/month/year)
15/07/1999Applicant
THOMSON LICENSING S.A.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER


The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Event	DA Final CT43 to Davidaby
Deadline	15 NOV 2001
Entered	DRF 8/8/01

Name and mailing address of the IPEA/



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Authorized officer

Slater, S

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PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RCA89608	FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US00/18893	International filing date (<i>day/month/year</i>) 12/07/2000	Priority date (<i>day/month/year</i>) 15/07/1999	
International Patent Classification (IPC) or national classification and IPC G06K7/00			
Applicant THOMSON LICENSING S.A.			

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the report

II ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☒ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand 09/02/2001	Date of completion of this report 19.07.2001
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized officer Heusler, N Telephone No. +49 89 2399 2359



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/18893

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-3,5-7	as originally filed			
4	as received on	18/06/2001	with letter of	13/06/2001

Claims, No.:

1-13	as received on	18/06/2001	with letter of	13/06/2001
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Drawings, sheets:

1,2	as originally filed
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2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/18893

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3,6,9,13
	No:	Claims	1,2,4,5,7,8,10-12
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-13
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/18893

The following documents are cited:

- D1: DE - C - 195 23 275 (cited by the examiner)
D2: EP - A - 0 409 241
D3: US - A - 5 712 472
D4: EP - A - 0 513 507 (cited by the examiner)
D5: EP - A - 0 733 987 (cited by the examiner)
D6: US - A - 5 675 654 (cited by the examiner)

Ad V.2 - novelty, inventive step; citations and explanations

1. The application **relates to** an apparatus able to process IC cards of two different standards (for example ISO 7816 and NRSS = National Renewable Security Standards Committee). There is the **problem** that an apparatus of this kind usually requires two card slots, one for each format.

The **solution** is to connect two different interfaces to one card slot. An interface controller determines whether the IC card inserted into the reader is an ISO 7816 or NRSS card and provides the correct interface for the IC card. In order to determine the type, a test signal is sent to the I/O contact of the card. The same contact is then detected to determine whether the IC card sends a reply signal in response to the test signal. One type of cards will answer the test signal, whereas the other type will not.

The application claims means for blocking or enabling signals over at least one of said operational contacts, in response to determining whether the first or the second type of card is present in the reader. In other words, certain contact pads on the IC card which are not used in the first format are blocked (gated off) if such a card is inserted; these contacts are enabled only on insertion of a card of the second type, where these contacts can actually be used.

2. Also **closest prior art** D2 deals with the problem of reading IC cards of different standards. In col. 5, lines 15- 43 it is described that the reader polls the card to find out whether the card has more contacts (col. 2, lines 8-13) than the eight ISO terminals. If so, the cards sends back a particular reply code to the reader, which in turn communicates with such a card using additional contacts. A conventional ISO card would not reply, and the reader would not activate the additional contacts for such a card.

Similar to the present application, also in D2 only those signal lines are enabled that are appropriate for the detected card (see the four cases listed in col. 4, lines 3-26 of D2: the corresponding data lines are gated on or off as a result of the detection of certain card types).

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/18893

D2 discloses a computer controlled device (col. 3, line 34: "large computer") operable using an integrated circuit card of a first type or of a second type (for example col. 6, lines 10-15), comprising a card reader, coupled to a microcontroller (Fig. 6, item 30, 40), wherein the card reader receives the IC card, said card reader having means for applying a first signal to at least one of the operational contacts (C7, C7') of the IC card (col. 5, lines 15-20) that is placed in the card reader, wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal (see col. 5, lines 26-43); means for determining whether the IC card in the reader has produced the second signal (col. 5, lines 21-43), wherein means (D2, Fig. 6, lines 21, 22, 41, 42) are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means (in D2, Fig. 6, buffers 51, 61, 52, 62 etc. are enabled or blocked depending on whether the card has additional contacts or not).

For these reasons the subject matter of **claim 1** is not novel (Art. 33 (2) PCT).

3. D1 discloses a method of reading data from an IC card, where several types of IC cards can be used. The document suggests to send a reset signal to the card (see col. 4, lines 4-27) and to detect the I/O to determine which IC card has been inserted, and to select the appropriate protocol (see, for example, col. 3, lines 45-50). Fig. 2 of D1 reflects this method. D1 does, however, not suggest to block or enable signals over operational contacts. D1 rather distinguished between cards that are adapted for different clock frequencies.

Similar to the present application, also D3 solves the problem of reading two different types of IC cards (col. 1, lines 43/44) with only one reader (col. 2, lines 10-18 and lines 37-43; col. 4, lines 49-53). The reader sends a reset signal to the card (col. 4, lines 21/22). Depending on whether the IC card answers this signal ("ATR": answer-to-reset; col. 4, lines 33-49), the reader determines that the card is of a first or of a second type (see abstract).

Also D4 and D5 disclose a system where the type of an inserted IC card is determined by evaluating an answer-to-reset signal.

D6 provides very basic information on NRSS smart cards (bottom of col. 1) without mentioning the problem of the present application.

4. One of the two types used in D2 is the well known ISO 7816 card. Hence **claim 2** lacks novelty.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/18893

5. It is obvious to use the circuit of D2 for an NRSS card. **Claim 3** adds nothing inventive (Art. 33 (3) PCT).
6. **Claim 4** adds the feature that the I/O line is used for determining the card type. This is also the case in D2 where the C7 and C7' lines are used for that purpose (col. 5, as cited above; see Fig. 6; col. 1, lines 35/36 and line 45).
7. The interface controller of **claim 5** having a conductive path to the card is also known from D2.
8. **Claim 6** defines the buffer elements for blocking a conductive path to a contact of the IC card unless said buffer receives an enable signal. Such buffers are shown in Fig. 6 of D2; the functionality is described in col. 3, lines 3-26.

D2 does not mention resistors coupled to the IC card connector. However, it is well known in the art to use pull-up resistors to bring a signal line to a defined potential when not in use. **Claim 6** adds nothing inventive.

9. Corresponding objections apply to **claims 7 to 13**.

Ad VII. - certain defects (form and content, Rules 5 - 7 PCT)

1. The independent claims are in the two-part-form (Rule 6.3b PCT), but the description does not make clear against which document the claims are delimited.
2. The relevant documents (D1, D2, D3, D4, D5 and D6) are not acknowledged in the description (Rule 5.1a PCT).
4. The description has not been adapted to the claims (Rule 5.1a PCT).

4 531 Rec'd PCT/FT. 10/030788 11 JAN 2002

The computer-controlled device 104 comprises a computer-controlled system 106, a microcontroller 112, a memory 114 and a card reader 116. The microcontroller is a processor that retrieves and executes a card reading software or routine 300 from the memory 114, instructs the card reader 116 to detect the IC card 102 received therein, and activates the computer controlled system 106 upon an acknowledgement from the card reader 116. The computer-controlled system 106 is a system or module that operates the IC card system 100 in response to a signal from the microcontroller 112. The memory 114 stores the card reading routine 300 or method, as well as other applications for implementing the IC card system 100.

The card reader 116 couples the IC card 102 to the computer-controlled device 104 at an interface 118. The card reader 116 comprises a connector 120 and an interface controller 122. The connector 120 comprises eight pins that form the interface 118 between the interface controller 122 and the IC card 102. If the pins are coupled to the contacts of the IC card 102, then these pins form conductive paths for transmitting or receiving signals and data through the interface 118. Additionally, the card reader 116 comprises a buffer 124 and a resistor 126 for further defining the interface 118.

The signals and data at the interface 118 are typically assigned to the contacts of the ISO/7816 and NRSS cards as depicted in FIG. 2. Five of the contacts have the same assigned signals for the two types of IC cards 102 depicted, namely: supply voltage, reset signal, clock signal, ground and data input/output. Another contact, typically the sixth contact (C6) of the IC card 102, is assigned to a programming signal for the ISO/7816 card and a NRSS clock signal for the NRSS card. The two remaining contacts, typically the fourth and eighth contacts (C4 and C8) on the IC card 102, are undefined for ISO/7816 cards, but represent high speed data input and output paths on NRSS cards.

The buffer 124 is coupled to the interface controller 122 and the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102.

CLAIMS

1. A computer controlled device (104) operable using an integrated circuit (IC) card of a first type or of a second type, the device comprising:
 - 5 a card reader (116), coupled to a microcontroller (112), wherein the card reader (116) receives the IC card, said card reader having means (122) for applying a first signal to at least one of the operational contacts of the IC card (102) that is placed in said card reader (116); wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal;
 - 10 means (122, 112) for determining whether the IC card in the card reader (116) has produced the second signal; and characterized in that means (124) are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means.
2. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an ISO/7816 card.
- 20 3. The computer controlled device of claim 1 wherein one of said cards of the first type and of the second type is an NRSS card.
4. The computer controlled device of claim 1 wherein said card reader (116) applies the first signal to an input/output contact (C7) of the IC card (102) and monitors whether the IC card produces the second signal at the input/output contact (C7) of the IC card.
- 25 5. The computer controlled device of claim 1 wherein at least one of the means for producing, the means for determining and the means for blocking is contained in an interface controller (122), and wherein said operational contacts comprise a connector (120) coupled to said interface controller (122), for providing a conductive path between said interface controller and the IC card (102).
- 30 6. The computer controlled device of claim 1 wherein said means for one of blocking and enabling comprises:
 - a buffer (124), coupled between said interface controller (122) and said connector (120), for blocking and enabling a signal to pass along a conductive path including a contact of the IC card, the buffer (124) being responsive to a signal from said interface controller (122); and
 - a resistor (126), coupled to said connector (120), for coupling the contact of the IC card to a supply voltage (Vcc).

7. A method of providing an interface for an integrated circuit (IC) card (102) of a first type or of a second type, the IC card having operational contacts and responding differently to signals applied to their respective operational contacts, the method comprising the steps of:

providing one reader (116) having operational contacts for receiving the IC card;

5 accepting an integrated circuit (IC) card (102) into the reader;

determining whether the integrated circuit (IC) card (102) in the reader (116) is a card of the first type or a card of the second type by subjecting the card (102) in the reader (116) to a signal and determining whether a responsive signal from the card is characteristic of a card of the first type or a card of the second type; and

10 implementing an interface for the identified IC card, characterized in that at least one signal path to predetermined ones of the operational contacts is enabled, or at least one signal path is disabled (122, 124, 126), as a result of whether the responsive signal was determined to be characteristic of the first type or the second type.

15 8. The method of claim 7 wherein the signal is selected such that a card (102) of one of said first and second types transmits a reply signal in response to the signal and a card (102) of the other of said first and second types is non-responsive to the signal.

9. The method of claim 7 wherein the signal is a reset signal.

20 10. The method of claim 7 wherein said implementing step comprises the step of disabling selected contacts of the IC card (C4, C8) if said determining step identifies the IC card as a card of one of said two types.

25 11. The method of claim 7 wherein said implementing step comprises the step of enabling selected contacts of the IC card (C4, C8) if said determining step identifies the IC card as a card of one of said two types.

12. The method of claim 7 wherein one of said types is ISO/7816.

30 13. The method of claim 7 wherein one of said types is NRSS.

PATENT COOPERATION TREATY

PCT



REC'D 23 JUL 2001

WIPO

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference RCA89608	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US00/18893	International filing date (day/month/year) 12/07/2000	Priority date (day/month/year) 15/07/1999
International Patent Classification (IPC) or national classification and-IPC G06K7/00		
Applicant THOMSON LICENSING S.A.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 3 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none">I <input checked="" type="checkbox"/> Basis of the reportII <input type="checkbox"/> PriorityIII <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicabilityIV <input type="checkbox"/> Lack of unity of inventionV <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statementVI <input type="checkbox"/> Certain documents citedVII <input checked="" type="checkbox"/> Certain defects in the international applicationVIII <input type="checkbox"/> Certain observations on the international application		
Date of submission of the demand 09/02/2001	Date of completion of this report 19.07.2001	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Heusler, N Telephone No. +49 89 2399 2359 	

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/18893

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-3,5-7 as originally filed

4 as received on 18/06/2001 with letter of 13/06/2001

Claims, No.:

1-13 as received on 18/06/2001 with letter of 13/06/2001

Drawings, sheets:

1,2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/US00/18893

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3,6,9,13
	No:	Claims	1,2,4,5,7,8,10-12
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-13
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/18893

The following documents are cited:

- D1: DE - C - 195 23 275 (cited by the examiner)
- D2: EP - A - 0 409 241
- D3: US - A - 5 712 472
- D4: EP - A - 0 513 507 - (cited by the examiner)
- D5: EP - A - 0 733 987 (cited by the examiner)
- D6: US - A - 5 675 654 (cited by the examiner)

Ad V.2 - novelty, inventive step; citations and explanations

1. The application **relates to** an apparatus able to process IC cards of two different standards (for example ISO 7816 and NRSS = National Renewable Security Standards Committee). There is the **problem** that an apparatus of this kind usually requires two card slots, one for each format.

The **solution** is to connect two different interfaces to one card slot. An interface controller determines whether the IC card inserted into the reader is an ISO 7816 or NRSS card and provides the correct interface for the IC card. In order to determine the type, a test signal is sent to the I/O contact of the card. The same contact is then detected to determine whether the IC card sends a reply signal in response to the test signal. One type of cards will answer the test signal, whereas the other type will not.

The application claims means for blocking or enabling signals over at least one of said operational contacts, in response to determining whether the first or the second type of card is present in the reader. In other words, certain contact pads on the IC card which are not used in the first format are blocked (gated off) if such a card is inserted; these contacts are enabled only on insertion of a card of the second type, where these contacts can actually be used.

2. Also **closest prior art** D2 deals with the problem of reading IC cards of different standards. In col. 5, lines 15- 43 it is described that the reader polls the card to find out whether the card has more contacts (col. 2, lines 8-13) than the eight ISO terminals. If so, the cards sends back a particular reply code to the reader, which in turn communicates with such a card using additional contacts. A conventional ISO card would not reply, and the reader would not activate the additional contacts for such a card.

Similar to the present application, also in D2 only those signal lines are enabled that are appropriate for the detected card (see the four cases listed in col. 4, lines 3-26 of D2: the corresponding data lines are gated on or off as a result of the detection of certain card types).

D2 discloses a computer controlled device (col. 3, line 34: "large computer") operable using an integrated circuit card of a first type or of a second type (for example col. 6, lines 10-15), comprising a card reader, coupled to a microcontroller (Fig. 6, item 30, 40), wherein the card reader receives the IC card, said card reader having means for applying a first signal to at least one of the operational-contacts (C7, C7') of the IC card (col. 5, lines 15-20) that is placed in the card reader, wherein the IC card of the first type responds differently to the first signal than the IC card of the second type, at least one of the IC cards producing a distinct second signal in response to the first signal (see col. 5, lines 26-43); means for determining whether the IC card in the reader has produced the second signal (col. 5, lines 21-43), wherein means (D2, Fig. 6, lines 21, 22, 41, 42) are provided for one of blocking and enabling signals over at least one of said operational contacts, in response to said determining means (in D2, Fig. 6, buffers 51, 61, 52, 62 etc. are enabled or blocked depending on whether the card has additional contacts or not).

For these reasons the subject matter of **claim 1** is not novel (Art. 33 (2) PCT).

3. D1 discloses a method of reading data from an IC card, where several types of IC cards can be used. The document suggests to send a reset signal to the card (see col. 4, lines 4-27) and to detect the I/O to determine which IC card has been inserted, and to select the appropriate protocol (see, for example, col. 3, lines 45-50). Fig. 2 of D1 reflects this method. D1 does, however, not suggest to block or enable signals over operational contacts. D1 rather distinguished between cards that are adapted for different clock frequencies.

Similar to the present application, also D3 solves the problem of reading two different types of IC cards (col. 1, lines 43/44) with only one reader (col. 2, lines 10-18 and lines 37-43; col. 4, lines 49-53). The reader sends a reset signal to the card (col. 4, lines 21/22). Depending on whether the IC card answers this signal ("ATR": answer-to-reset; col. 4, lines 33-49), the reader determines that the card is of a first or of a second type (see abstract).

Also D4 and D5 disclose a system where the type of an inserted IC card is determined by evaluating an answer-to-reset signal.

D6 provides very basic information on NRSS smart cards (bottom of col. 1) without mentioning the problem of the present application.

4. One of the two types used in D2 is the well known ISO 7816 card. Hence **claim 2** lacks novelty.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US00/18893

5. It is obvious to use the circuit of D2 for an NRSS card. **Claim 3** adds nothing inventive (Art. 33 (3) PCT).
6. **Claim 4** adds the feature that the I/O line is used for determining the card type. This is also the case in D2 where the C7 and C7' lines are used for that purpose (col. 5, as cited above; see Fig. 6; col. 1, lines 35/36 and line 45).
7. The interface controller of **claim 5** having a conductive path to the card is also known from D2.
8. **Claim 6** defines the buffer elements for blocking a conductive path to a contact of the IC card unless said buffer receives an enable signal. Such buffers are shown in Fig. 6 of D2; the functionality is described in col. 3, lines 3-26.

D2 does not mention resistors coupled to the IC card connector. However, it is well known in the art to use pull-up resistors to bring a signal line to a defined potential when not in use.

Claim 6 adds nothing inventive.

9. Corresponding objections apply to **claims 7 to 13**.

Ad VII. - certain defects (form and content, Rules 5 - 7 PCT)

1. The independent claims are in the two-part-form (Rule 6.3b PCT), but the description does not make clear against which document the claims are delimited.
2. The relevant documents (D1, D2, D3, D4, D5 and D6) are not acknowledged in the description (Rule 5.1a PCT).
4. The description has not been adapted to the claims (Rule 5.1a PCT).



(84) **Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(48) **Date of publication of this corrected version:**

12 September 2002

(15) **Information about Correction:**

see PCT Gazette No. 37/2002 of 12 September 2002, Section II

Published:

- with international search report
- with amended claims

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

METHOD AND APPARATUS FOR SUPPORTING TWO DIFFERENT TYPES OF INTEGRATED CIRCUIT CARDS WITH A SINGLE CONNECTOR

BACKGROUND OF THE DISCLOSURE

5

1. Field of the Invention

The present invention relates to interfaces in a system using integrated circuit (IC) cards. More particularly, the invention relates to a method and apparatus for supporting two different IC card standards using a single IC card
10 connector.

2. Description of the Background Art

Integrated circuit (IC) cards, such as smart cards, are used in a variety of consumer electronics devices, including pay TV systems, set top cable television
15 boxes, terrestrial television receivers, satellite television receivers and the like. Two types of IC card are based upon the ISO/7816 standard for conventional IC cards and the NRSS standard for IC cards having high-speed data transfer ports. The current IC card systems comprise a connector that is capable of supporting (or operating as an interface to) only one type of IC card. For example, a
20 connector capable of supporting an ISO/7816 card cannot support a NRSS card, and vice versa. In order to support both types of IC cards, the IC card system would require an additional IC card connector. Therefore, a need exists for an IC card interface capable of supporting ISO/7816 and NRSS cards with a single connector.

25

SUMMARY OF THE INVENTION

The invention overcomes the disadvantages associated with the prior art by providing a method and apparatus capable of receiving ISO/7816 and NRSS cards with a single connector. The apparatus is a computer-controlled device

comprising a card reader that further comprises an interface controller and a connector. The connector, which comprises eight pins, forms an interface between the computer controlled device and eight corresponding contacts of the IC card, i.e., contacts C1 through C8. The interface controller determines
5 whether the IC card inserted into the card reader is an ISO/7816 or NRSS card and provides the correct interface for the IC card.

Specifically, an interface controller sends a test signal to the input/output contact (C7) of the IC card and detects this contact (C7) to determine whether the IC card sends a reply or answer signal in response to the test signal. The
10 test signal is selected such that one type of IC card replies to the test signal, while the other type of IC card responds differently, e.g., is non-responsive, to the test signal. Once the interface controller determines the type of IC card, the interface controller implements the correct interface for the detected IC card.

*For example, the interface may comprise buffers and pull-up resistors. Buffers
15 block selected signals in the connectors (associated with contacts C4, C6 and C8) unless enabled by the interface controller. If the interface controller detects the IC card as a NRSS card, then the interface controller sends a "buffer enable" signal to the buffers. Pull-up resistors are coupled to connectors associated with selected contacts (C4, C6 and C8) on the IC card, in case the IC card is a NRSS
20 card.*

The inventive method comprises the steps of determining whether an IC card is an ISO/7816 or NRSS card and implementing an interface for the identified IC card. The determining step further includes the steps of applying a test signal to the IC card and identifying whether the IC card transmits a reply
25 signal in response to the test signal. The implementing step may include blocking or enabling a buffer such that signals are transmitted to selected contacts of one type of IC card (i.e., a NRSS card) and blocked to selected contacts of the other type of IC card (i.e., an ISO/7816 card).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts a block diagram of an integrated circuit (IC) card system including a IC card interface that operates in accordance with the present invention;

FIG. 2 depicts an assignment of signal contacts on a IC card; and

FIG. 3 depicts a flow diagram showing the operation of the present invention.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures.

DETAILED DESCRIPTION

FIG. 1 depicts an integrated circuit (IC) card system 100 comprising an IC card 102 and a computer controlled device 104. The IC card 102 is typically a smart card, an access card or a memory card for enabling the computer-controlled device 104 to operate a computer controlled system 106. The IC card 102 comprises a card controller 108 and a card memory 110. The card controller 108 coordinates signal and data transfer between the card memory 110 and the computer controlled device 104.

The IC card 102 includes an arrangement of contacts that generally comply with either the conventional ISO/7816 standard or the NRSS standard for high-speed data transfer. Variations of the ISO/7816 and NRSS cards are contemplated within the scope of the invention.

The computer-controlled device 104 generally includes any device that operates a computer-controlled system 106 upon receipt of the IC card 102. Examples of such computer-controlled devices 104 include a direct broadcast satellite television system, set top cable television boxes for cable and video-on-demand systems, high definition television system, terrestrial television receivers, satellite television receivers and other similar devices.

The computer-controlled device 104 comprises a computer-controlled system 106, a microcontroller 112, a memory 114 and a card reader 116. The microcontroller 110 is a processor that retrieves and executes a card reading software or routine 300 from the memory 114, instructs the card reader 116 to
5 detect the IC card 102 received therein, and activates the computer controlled system 106 upon an acknowledgement from the card reader 116. The computer-controlled system 106 is a system or module that operates the IC card system 100 in response to a signal from the microcontroller 112. The memory 114 stores the card reading routine 300 or method, as well as other applications
10 for implementing the IC card system 100.

The card reader 116 couples the IC card 102 to the computer-controlled device 104 at an interface 118. The card reader 116 comprises a connector 120 and an interface controller 122. The connector 120 comprises eight pins that form the interface 118 between the interface controller 122 and the IC card
15 102. If the pins are coupled to the contacts of the IC card 102, then these pins form conductive paths for transmitting or receiving signals and data through the interface 118. Additionally, the card reader 116 comprises a buffer 124 and a resistor 126 for further defining the interface 118.

The signals and data at the interface 118 are typically assigned to the
20 contacts of the ISO/7816 and NRSS cards as depicted in FIG. 2. Five of the contacts have the same assigned signals for the two types of IC cards 102 depicted, namely: supply voltage, reset signal, clock signal, ground and data input/output. Another contact, typically the sixth contact (C6) of the IC card 102, is assigned to a programming signal for the ISO/7816 card and a NRSS
25 clock signal for the NRSS card. The two remaining contacts, typically the fourth and eighth contacts (C4 and C8) on the IC card 102, are undefined for ISO/7816 cards, but represent high speed data input and output paths on NRSS cards.

The buffer 124 is coupled to the interface controller 122 and the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102.

Specifically, the buffer 124 may block or disable the conductive path to and from the contacts C4, C6 and C8. If the buffer 124 receives a "buffer enable" signal from the interface controller 122, then the buffer 124 enables the conductive path between the interface controller 122 and contacts C4, C6 and C8 of the IC card 102.

The resistor 126 is coupled to a supply voltage, typically 5 volts, as well as to the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102. If the buffer 124 blocks the conductive path to and from these contacts C4, C6 and C8, the pins associated with these connector are "pulled up" to the supply voltage. In this case, the supply voltage drives the contacts C4, C6 and C8. The pull up resistor 126 is generally of high resistance, such that the effect on the conductive path is minimal when the buffer 124 is enabled, i.e., a "weak" pull-up.

The interface controller 122 is a processor that determines whether the IC card 102 is an ISO/7816 or NRSS card. The interface controller 122 performs this determination while the microcontroller executes the routine or method 300. Once the correct IC card 102 is determined, the interface controller 122 implements the correct interface 118 for the ISO/7816 or NRSS card 102. The steps for determining the type of IC card 102 and implementing the correct interface for the IC card 102 are described with respect to FIG. 3.

FIG. 3 depicts a flow diagram of the routine or method 300 used in the present invention. Specifically, the microcontroller 112 executes the method 300 and the interface controller 122 implements the method 300 for determining whether the received IC card 102 is an ISO 7816 or NRSS card.

Once the IC card 102 is inserted into the card reader 116, the method 300 starts at step 302. At step 304, the method 300 assumes that the received IC card 102 is an ISO/7816 card. At this point, the buffers 124 are disabled for blocking the conductive path to and from contacts C4, C6 and C8

of the IC card 102. The pins associated with these contacts are pulled up to the supply voltage.

At step 306, the method 300 instructs the interface controller 122 to apply a test signal or a reset signal to contact C7 on the IC card 102. The test
5 signal is selected such that the card controller 108 in one type of IC card 102 responds to the test signal, whereas the card controller 108 in the other type of IC card 102 responds differently, e.g., is non-responsive, to the test signal. For example, the test signal or reset signal may elicit a response from the ISO/7816 card and no response from the NRSS card.

10 At step 308, the interface controller 122 determines whether the received IC card 102 is a NRSS card. Specifically, the interface controller 122 determines whether the card controller 108 of the IC card 102 transmits a reply signal on contact C7. If the selected test or reset signal elicits a response from only an ISO/7816 card, the interface controller 122 checks for the absence of a reply
15 signal from the IC card 102.

If the interface controller 122 identifies the IC card 102 as a NRSS card, the method 300 proceeds to step 310, where the interface controller 122 implements an interface 118 for the NRSS card. In this case, the interface controller 122 sends buffer enable signals to the buffers 124. Once the buffers
20 124 receive the buffer enable signal, the interface controller 122 may transmit NRSS input data and NRSS clock signals to contacts C4 and C6, and receive NRSS output data from contact C8 of the NRSS card.

If the interface controller 122 identifies the IC card 102 as an ISO/7816 card, the method 300 proceeds to step 312, where the interface controller 122
25 implements an interface 118 for the ISO/7816 card. In this case, there are no buffer enable signals and the buffers 124 continue to disable the conductive paths to and from contacts C4, C6 and C8 of the ISO/7816 card.

Although one embodiment, which incorporates the teachings of the present invention, has been shown and described in detail herein, those skilled in

the art can readily devise many other varied embodiments that still incorporate these teachings.

What is claimed is:

1. A computer controlled device comprising:
 - a card reader, coupled to said microcontroller, operating as an interface for both ISO/7816 and NRSS cards, said card reader having
 - means for producing a first signal to the interface between said card reader and an IC card;
 - means for analyzing whether the IC card produces a second signal in response to the first signal.
2. The computer controlled device of claim 1 wherein said card reader applies the first signal to an input/output contact of the IC card and monitors whether the IC card produces the second signal at the input/output contact of the IC card.
3. The computer controlled device of claim 1 wherein said card reader comprises:
 - an interface controller for implementing an interface for a specific type of IC card detected by said card reader.
4. The computer controlled device of claim 3 wherein said card reader further comprises:
 - a connector, coupled to said interface controller, for providing a conductive path between said interface controller and the IC card.
5. The computer controlled device of claim 4 wherein said card reader further comprises:

a buffer, coupled between said interface controller and said connector, for blocking a conductive path to a contact of the IC card unless said buffer receives an enable signal from said interface controller; and

a resistor, coupled to said connector, for coupling the contact of the IC card to a supply voltage.

6. A method of providing an interface for ISO/7816 and NRSS cards, the method comprising the steps of:

determining whether an integrated circuit (IC) card is a ISO/7816 card or a NRSS card; and

implementing an interface for the identified IC card.

7. The method of claim 6 wherein said determining step comprises the steps of:

applying a test signal to the IC card; and

identifying whether the IC card transmits a particular reply signal in response to the test signal.

8. The method of claim 7 wherein the test signal is selected such that an ISO/7816 card transmits a reply signal in response to the test signal and a NRSS card is non-responsive to the test signal.

9. The method of claim 7 wherein the test signal is a reset signal.

10. The method of claim 6 wherein said implementing step comprises the step of disabling selected contacts of the IC card if said determining step identifies the IC card as an ISO/7816 card.

11. The method of claim 6 wherein said implementing step comprises the step of enabling selected contacts of the IC card if said determining step identifies the IC card as a NRSS card.

12. An apparatus for receiving ISO/7816 and NRSS cards with one interface, the apparatus comprising:

- an interface capable of distinguishing between ISO/7816 and NRSS cards;
- a IC card comprising a IC card controller; and
- a computer-controlled device for implementing said interface for the ISO/7816 and NRSS cards upon receipt of said IC card.

13. The apparatus of claim 12 wherein said computer-controlled device comprises:

- a memory for storing computer code;
- a microcontroller, coupled to said memory, for executing computer code;

and

- a card reader, coupled to said microcontroller, operating as an interface for ISO/7816 cards and NRSS cards.

AMENDED CLAIMS

[received by the International Bureau on 11 December 2000 (11.12.00);
new claim 14 added; remaining claims unchanged (1 page)]

11. The method of claim 6 wherein said implementing step comprises the step
of enabling selected contacts of the IC card if said determining step identifies the
5 IC card as a NRSS card.
12. An apparatus for receiving ISO/7816 and NRSS cards with one interface,
the apparatus comprising:
an interface capable of distinguishing between ISO/7816 and NRSS cards;
10 a IC card comprising a IC card controller; and
a computer-controlled device for implementing said interface for the
ISO/7816 and NRSS cards upon receipt of said IC card.
13. The apparatus of claim 12 wherein said computer-controlled device
15 comprises:
a memory for storing computer code;
a microcontroller, coupled to said memory, for executing computer code;
and
a card reader, coupled to said microcontroller, operating as an interface for
20 ISO/7816 cards and NRSS cards.
- 14 A computer controlled device comprising:
a card reader, coupled to a microcontroller, said card reader operative as
an interface for both ISO/7816 and NRSS cards, said card reader having:
25 a controller for configuring a plurality of connection paths in an initial
configuration associated with only one of said ISO/7816 and NRSS cards;
a circuit for producing a first signal to the interface between said card
reader and an IC card over one communication path; and
a circuit for analyzing whether the IC card produces a second signal in
30 response to the first signal.

2/2

CONTACT#	ISO/7816 ASSIGNMENT	NRSS ASSIGNMENT
C1	VCC (SUPPLY VOLTAGE)	VCC (SUPPLY VOLTAGE)
C2	RST (RESET SIGNAL)	RST (RESET SIGNAL)
C3	CLK (CLOCK SIGNAL)	CLK (CLOCK SIGNAL)
C4	RESERVED	NRSS DATA INPUT
C5	GND (GROUND)	GND (GROUND)
C6	VPP (PROGRAMMING VOLTAGE)	NRSS CLOCK SIGNAL
C7	I/O (DATA INPUT/OUTPUT)	I/O (DATA INPUT/OUTPUT)
C8	RESERVED	NRSS DATA OUTPUT

FIG. 2

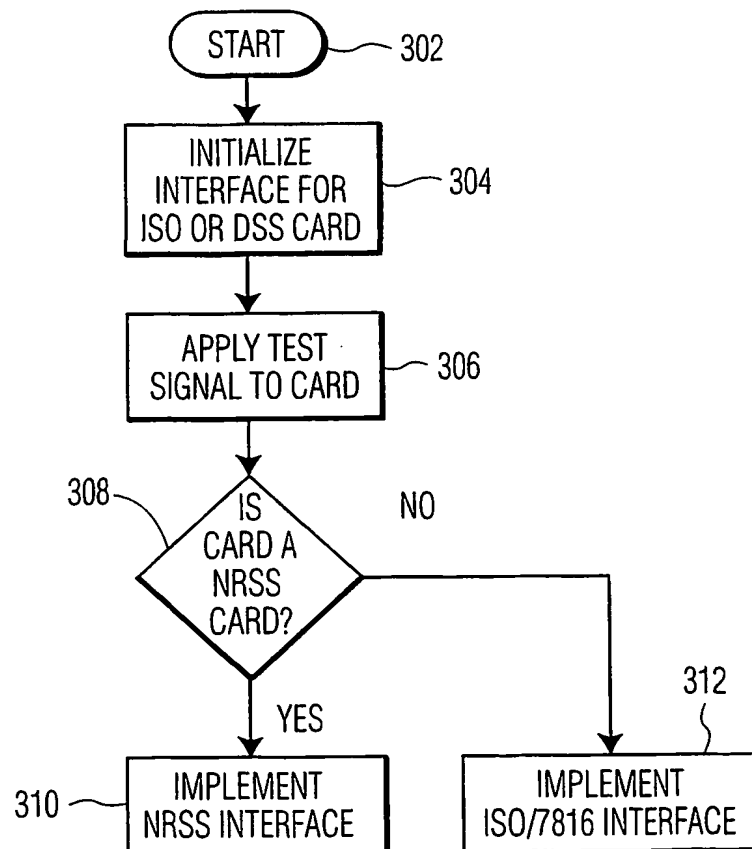


FIG. 3

INTERNATIONAL SEARCH REPORT

Intern al Application No

PCT/US 00/18893

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G06K7/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 409 241 A (TOKYO SHIBAURA ELECTRIC CO) 23 January 1991 (1991-01-23) claims 1,2,4,5 ---	1,2,6-8, 10,11 4,5,12
X A	US 5 847 372 A (KREFT HANS-DIEDRICH) 8 December 1998 (1998-12-08) column 1, line 58 - line 61 claims 2,8,10,17 ---	1,2,6 4
X	US 5 712 472 A (LEE SUNG-CHEOUL) 27 January 1998 (1998-01-27) claims 1,2,5 -----	1,6-8,12

☐ Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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*replaced by
Article 29*

The computer-controlled device 104 comprises a computer-controlled system 106, a microcontroller 112, a memory 114 and a card reader 116. The microcontroller 110 is a processor that retrieves and executes a card reading software or routine 300 from the memory 114, instructs the card reader 116 to
5 detect the IC card 102 received therein, and activates the computer controlled system 106 upon an acknowledgement from the card reader 116. The computer-controlled system 106 is a system or module that operates the IC card system 100 in response to a signal from the microcontroller 112. The memory 114 stores the card reading routine 300 or method, as well as other applications
10 for implementing the IC card system 100.

The card reader 116 couples the IC card 102 to the computer-controlled device 104 at an interface 118. The card reader 116 comprises a connector 120 and an interface controller 122. The connector 120 comprises eight pins that form the interface 118 between the interface controller 122 and the IC card
15 102. If the pins are coupled to the contacts of the IC card 102, then these pins form conductive paths for transmitting or receiving signals and data through the interface 118. Additionally, the card reader 116 comprises a buffer 124 and a resistor 126 for further defining the interface 118.

The signals and data at the interface 118 are typically assigned to the
20 contacts of the ISO/7816 and NRSS cards as depicted in FIG. 2. Five of the contacts have the same assigned signals for the two types of IC cards 102 depicted, namely: supply voltage, reset signal, clock signal, ground and data input/output. Another contact, typically the sixth contact (C6) of the IC card 102, is assigned to a programming signal for the ISO/7816 card and a NRSS
25 clock signal for the NRSS card. The two remaining contacts, typically the fourth and eighth contacts (C4 and C8) on the IC card 102, are undefined for ISO/7816 cards, but represent high speed data input and output paths on NRSS cards.

The buffer 124 is coupled to the interface controller 122 and the pins of the connector associated with contacts C4, C6 and C8 of the IC card 102.

What is claimed is:

1. A computer controlled device comprising:
 - a card reader, coupled to said microcontroller, operating as an interface for both ISO/7816 and NRSS cards, said card reader having
 - means for producing a first signal to the interface between said card reader and an IC card;
 - means for analyzing whether the IC card produces a second signal in response to the first signal.
2. The computer controlled device of claim 1 wherein said card reader applies the first signal to an input/output contact of the IC card and monitors whether the IC card produces the second signal at the input/output contact of the IC card.
3. The computer controlled device of claim 1 wherein said card reader comprises:
 - an interface controller for implementing an interface for a specific type of IC card detected by said card reader.
4. The computer controlled device of claim 3 wherein said card reader further comprises:
 - a connector, coupled to said interface controller, for providing a conductive path between said interface controller and the IC card.
5. The computer controlled device of claim 4 wherein said card reader further comprises:

a buffer, coupled between said interface controller and said connector, for blocking a conductive path to a contact of the IC card unless said buffer receives an enable signal from said interface controller; and

a resistor, coupled to said connector, for coupling the contact of the IC card to a supply voltage.

6. A method of providing an interface for ISO/7816 and NRSS cards, the method comprising the steps of:

determining whether an integrated circuit (IC) card is a ISO/7816 card or a NRSS card; and

implementing an interface for the identified IC card.

7. The method of claim 6 wherein said determining step comprises the steps of:

applying a test signal to the IC card; and

identifying whether the IC card transmits a particular reply signal in response to the test signal.

8. The method of claim 7 wherein the test signal is selected such that an ISO/7816 card transmits a reply signal in response to the test signal and a NRSS card is non-responsive to the test signal.

9. The method of claim 7 wherein the test signal is a reset signal.

10. The method of claim 6 wherein said implementing step comprises the step of disabling selected contacts of the IC card if said determining step identifies the IC card as an ISO/7816 card.

11. The method of claim 6 wherein said implementing step comprises the step of enabling selected contacts of the IC card if said determining step identifies the IC card as a NRSS card.

12. An apparatus for receiving ISO/7816 and NRSS cards with one interface, the apparatus comprising:

an interface capable of distinguishing between ISO/7816 and NRSS cards;

a IC card comprising a IC card controller; and

a computer-controlled device for implementing said interface for the ISO/7816 and NRSS cards upon receipt of said IC card.

13. The apparatus of claim 12 wherein said computer-controlled device comprises:

a memory for storing computer code;

a microcontroller, coupled to said memory, for executing computer code;

and

a card reader, coupled to said microcontroller, operating as an interface for ISO/7816 cards and NRSS cards.

AMENDED CLAIMS

[received by the International Bureau on 11 December 2000 (11.12.00);
new claim 14 added; remaining claims unchanged (1 page)]

11. The method of claim 6 wherein said implementing step comprises the step
of enabling selected contacts of the IC card if said determining step identifies the
5 IC card as a NRSS card.
12. An apparatus for receiving ISO/7816 and NRSS cards with one interface,
the apparatus comprising:
an interface capable of distinguishing between ISO/7816 and NRSS cards;
10 a IC card comprising a IC card controller; and
a computer-controlled device for implementing said interface for the
ISO/7816 and NRSS cards upon receipt of said IC card.
13. The apparatus of claim 12 wherein said computer-controlled device
15 comprises:
a memory for storing computer code;
a microcontroller, coupled to said memory, for executing computer code;
and
a card reader, coupled to said microcontroller, operating as an interface for
20 ISO/7816 cards and NRSS cards.
- 14 A computer controlled device comprising:
a card reader, coupled to a microcontroller, said card reader operative as
an interface for both ISO/7816 and NRSS cards, said card reader having:
25 a controller for configuring a plurality of connection paths in an initial
configuration associated with only one of said ISO/7816 and NRSS cards;
a circuit for producing a first signal to the interface between said card
reader and an IC card over one communication path; and
a circuit for analyzing whether the IC card produces a second signal in
30 response to the first signal.